User's Manual

DVI Switcher

DS-21RA

Digital Extender®

Total Digital Connectivity Solutions

Cautions:

1. Digitalextender® logo is our own trademark of RTcom USA., Inc.
2. Any of the products may be changed without any notice in order to improve the function of the product.
3. The design and specification of the product may be changed without any prior notice.

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1. Basic understandings of the product

1-1 Cautions for safety

- All the safety and user manual should be read before the appliance is operated.
- The safety and operating instructions should be retained for future reference.
- Unplug this product from the wall outlet before clean. Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning.
- Do not use this equipment near wet place.
- This product should be operated only from the type of power sources indicated on the marking label. If you are not sure of the type of power supplied to your home, consult your local power company. For equipment intended to operate from battery power, or other source, refer to the user manual.
- Do not use any damaged power cords or plugs, or loosed outlets, this may cause electrical shock or fire.
- Do not put heavy articles such as other equipments on this product.
- Keep it away from liquid, inflammable substances.

If you experience any malfunctioning of product or have any question regard to operation of the product, please contact our customer service center.

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Tel: 973-383-4878 Fax: 973-383-1160
info@digitalextender.com

Declaration of Conformity

According to Council Directive 73/23/EEC (February 19, 1973) on the Harmonization of the Laws of Member States relating to Electrical Equipment; Council Directive 89/336/EEC (May 3, 1989) on Electromagnetic Compatibility; Council Directive 93/68/EEC (July 22, 1993)-Amending Directives 89/336/EEC (MC) and 73/23/EEC (Low Voltage Equipment Safety), and/or CPU Boards and Power Supplies used Council Directive 93/68/EEC with DS-21RA, RTcomUSA, Inc., 286 Houses Corner Rd. Sparta, NJ 09871 973-383-4878, declares under sole responsibility, that the product identifies with 93/66/EEC of the Council Directive Low Voltage Equipment Safety. Each product marketed is identical to the representative unit tested and found to be compliant with the standards.

1-2 Package Includes

Each DVI Switcher package includes the following items;

- DS-21RA Unit
- 5V Power Adapter
- User's manual

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1-3 Description, General Specification

Digitalextender® DVI switcher allows number of digital video & audio sources to share one video display.
Our unique switch allows easy switching between different digital video & audio sources with remote control unit or with a manual switching button place on the unit itself.
Perfect for home theater system. No more hassles of manually plugging in different DVI connectors to view different video sources (e.g., DVD, Satellite receiver, computer,).

ITEM	DESCRIPTION
Model Name	DS-21RA
Input Signal	DVI-D (TMDS)Single Link/ Standard Sound L,R
Output Signal	DVI-D (TMDS)Single Link / Standard Sound L,R
Resolution	Supports up to UXGA(1600x1200)@60Hz 480i/p , 720i/p , 1080i/p
Receptacle	DVI 24 Pin Female / Audio L,R / RS-232 9 pin Male
HDCP Support	OK
Power Consumption	Min1.0 W Max 1.6 W External Power - 5V Power Adapter(Included)
Dimension	270x105x40 (W/D/H)mm
Weight	0.8 kg

1-4 Environmental and Reliability Specifications

- The DS-21RA switcher recommended environmental operating limits are a temperature range from 10°C, non-condensing humidity levels from 10-80% and altitude ceiling of 3,000 meters (9,840 feet).
- Environmental limits for transportation are established as a temperature range of 25°C to 60°C, non-condensing humidity levels from 5-95%, and an altitude ceiling of 15,000 meter(49,200feet)
- Environmental limits for storage are established as a temperature range of -20°C to 45°C, non-condensing humidity levels from 5-95%, and an altitude ceiling of 3,000meters(9,840 feet)

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2 Main Features

1. High Quality Picture and Sound - No Signal Loss and Digital Noise Free
Our switchers are built to deliver the highest quality picture and sound preserving the native resolutions of the video & audio sources without any signal loss. At the same time, the digital noises that may affect the picture quality will be eliminated. Due to the nature of the digital signals and passing through multiple stages of connection when using switchers, it is important to eliminate the digital noises and boost the signal strength to preserve/ enhance the video & audio signal quality.

2. Signal Amplification for signal reliability and long length signal transmission.
Our 5V power adapter supplies adequate power to amplify the video signals from different video sources. This is necessary as the overall length from the video source to the displays is longer when using the switches (distance from the video source to the display). In most cases, the overall distance that the DVI signal will need to travel is over 10ft. Due to the nature of DVI signals, amplification is necessary to warrant the video quality and reliability. (Without amplification, there may be occasional blackouts or blinking effects) With this amplification feature, your video display can be extended up to 2300ft using our fiber optical DVI cables.

3. Compact and Practical Design
Our switchers have all of the DVI ports, power supply jack and RS232 port in the back of the unit allowing it be mounted on any racks or with any other components. In the front, there will be a remote control sensor, selector switch, RS232 LED indicators and channel indicators.

4. Remote Control Unit with Discreet Channel selections
Remote Control Units with discreet channel selection feature is included in all our switches. The channel buttons on the remote control unit will allow you to change video sources easily and quickly.

5. Supports HDMI signal
DS-21RA has HDMI compatible IC's, If your input sources and display equipment supports HDMI signals, you can use it same as HDMI switcher with DVI to HDMI adapters (Must all input sources & output display has HDMI ports, DVI ports carry video & sound signals)

6. RS232 Control
Our switches also feature RS232 Control. Our switches are capable of being controlled by a remote computer. This is extremely helpful for many applications where you need to automatically switch the video inputs. Example: If you connect a PC to our switcher, you can program it to automatically switch the sources. If you want to display input 1 for 1 hour and then switch to input 2, you can do this with the PC. The RS232 LED indicators in the front will allow you to check the communication between the PC and the switch. Most other products require additional control box for this function.

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3 Video Connection

VIDEO CONNECTION

1. Connect your video source's DVI output port to the DVI switch's DVI input port using standard DVI cables(not included). Make sure all your DVI sources and the display is turned off before connecting the cables)
2. Connect your DVI display's DVI input port to DVI switch's DVI output port. Make sure your DVI display is turned off before connecting the cables)
3. Connect your DVI source's audio output port to the switch's audio input port using standard audio cables(not included)
4. Connect your DVI display's audio input port to switch's audioI output port. Make sure your DVI display is turned off before connecting the cables(not included).
5. Plug the 5V power supply into the switch's power input port.
6. Plug the 5V wall mount power supply into the wall outlet.
7. Turn on your display.
8. Turn on your DVI sources.
9. Use your remote control unit to switch channels. Or use the select button on the front panel of the switch to change channels.

****** If you use digital audio switching output, must connect all digital audio (coaxial type) inputs with switcher .

RS232 CONTROL CONNECTION

RS232 connection allows the user to interface the DVI LINK switch with a serial port on a computer or other control device. The computer or other control device may require additional software for various control functions.

RS232 Control Information
Our DS-21RA use pin#2 and #3 and the assignments are as follows;

Control computer's RS232 pin# 2 is connected to our DVI switch's pin#3
Control computer's RS232 pin# 3 is connected to our DVI switch's pin#2

The control protocols are as follows;

Channel 1 request is ascii code "@001*" and the response back to the computer is "!"
Channel 2 request is ascii code "@002*" and the response back to the computer is "!"
Channel 3 request is ascii code "@003*" and the response back to the computer is "!"
Channel 4 request is ascii code "@004*" and the response back to the computer is "!"

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4 DVI Pin Description

Pin Symbol Functional Description

1. CH2-: TMDS Data Signal Channel 2 Negative
2. CH2+: TMDS Data Signal Channel 2 Positive
3. GND: TMDS Data Signal Channel 2/4 Shield
4. CH4-: TMDS Data Signal Channel 4 Negative
5. CH4+: TMDS Data Signal Channel 4 Positive
6. DDC Clock: DDC Clock line for DDC2B communication
7. DDC Data: DDC Data line for DDC2B communication
8. N.C.
9. CH1-TMDS: Data Signal Channel 1 Negative
10. CH1+ TMDS: Data Signal Channel 1 Positive
11. GND TMDS: Data Signal Channel 1/3 Shield
12. CH3-TMDS: Data Signal Channel 3 Negative
13. CH3+ TMDS: Data Signal Channel 3 Positive
14. 5 V: 5 V Input for Transmitter from Host
15. GND: Ground
16. Hot plug Detect Signal is driven by monitor to enable the system to identify the presence of a monitor
17. CH0-: TMDS Data Signal Channel 0 Negative
18. CH0+: TMDS Data Signal Channel 0 Positive
19. GND: TMDS Data Signal Channel 0/5 Shield
20. CH5-: TMDS Data Signal Channel 5 Negative
21. CH5+: TMDS Data Signal Channel 5 Positive
22. GND: TMDS Clock Signal Shield
23. CLK-: TMDS Clock Channel Negative
24. CLK+: TMDS Clock Channel Positive

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5 Troubleshooting

Problem	Solution
Switch will not operate	Make sure the 5V power is plugged in the back of the unit. Check to see if the power LED light is on.
No picture(or signal) and sound Or Poor picture	1. In case your video source is HDCP enabled, make sure your video display (HDTV) is HDCP compliant. 2. If you are using copper based DVI cable, overall length of the cables (length of the cable from video source to switch and length of the cable from switch to display) should not exceed 20ft. Exceeding 20ft. with copper based cables will result in no or poor picture quality. To extend beyond 20ft, please use fiber optical DVI extension cables such as RTcomUSA Inc.'s Model OC cables. 3. Use high quality DVI cables. 4. If you are using computers, try other refresh rate settings. Most HDTVs have refresh rate of 48Hz and computer's video cards are usually set at higher refresh rate. Try lower refresh rates (60Hz). 5. Make sure all DVI connectors are tightly secured to all DVI ports. loose screws on the DVI connectors will result in no or poor picture. 6. Turn off all equipments(video source, switch and HDTV) and restart all equipments. 7. If your HDTV has HDMI input only, should select audio signal via the audio terminals, Refer to the your HDTV operation manual
Remote control unit will not operate	Make sure the included batteries are correctly installed. Make sure the 5V power is plugged in the back of the unit. Check to see if the power LED light is on. Try rebooting the switch by unplugging and re-plugging in the AC plug of the 5V power adapter.
Programming Universal Remote Control	Our remote control units use unique codes. To program your own universal remote control, make sure to use "Learn" feature of your universal remote control unit. Refer to the universal remote control unit's user manual

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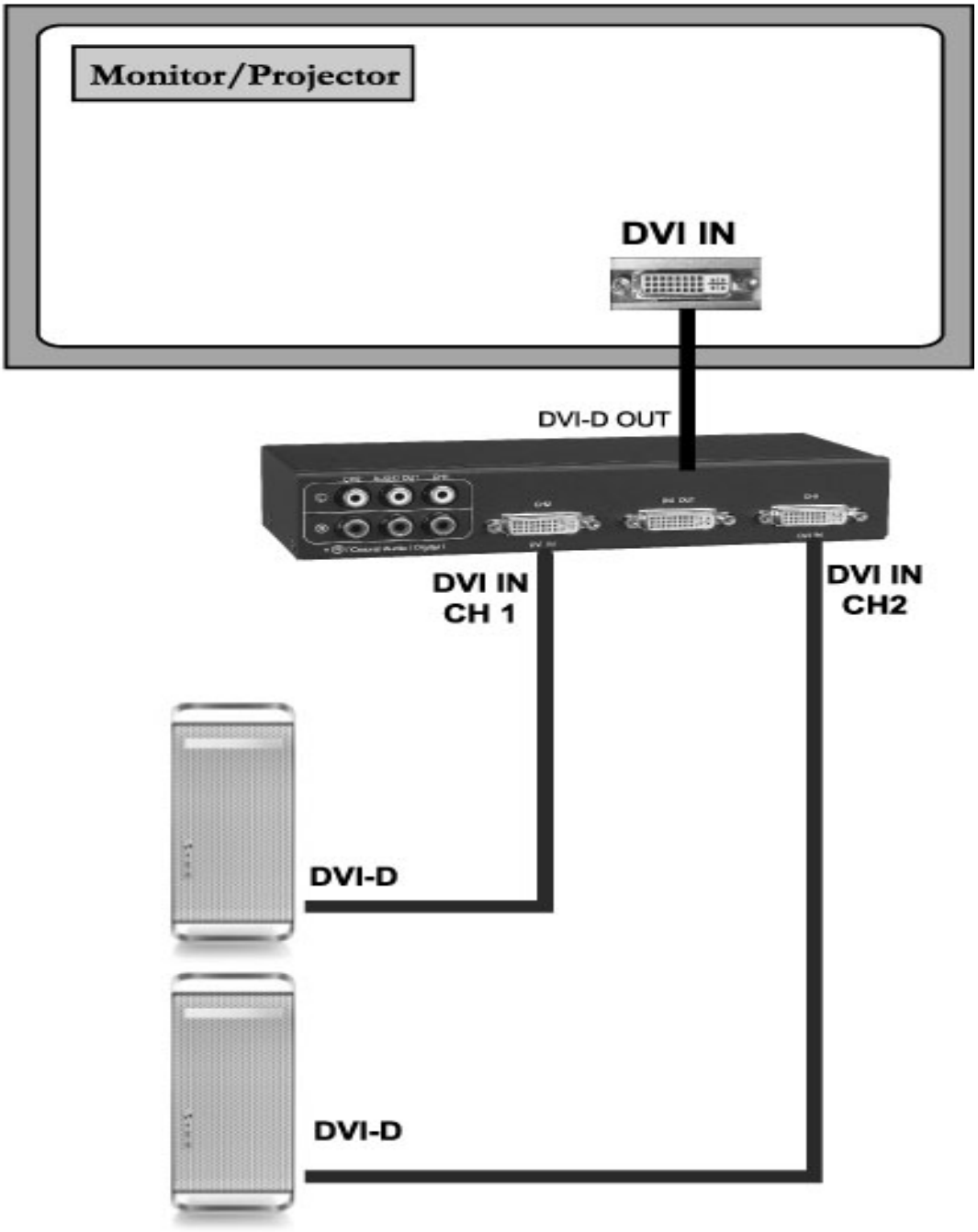
DS-21A/21RA Connection with Computer



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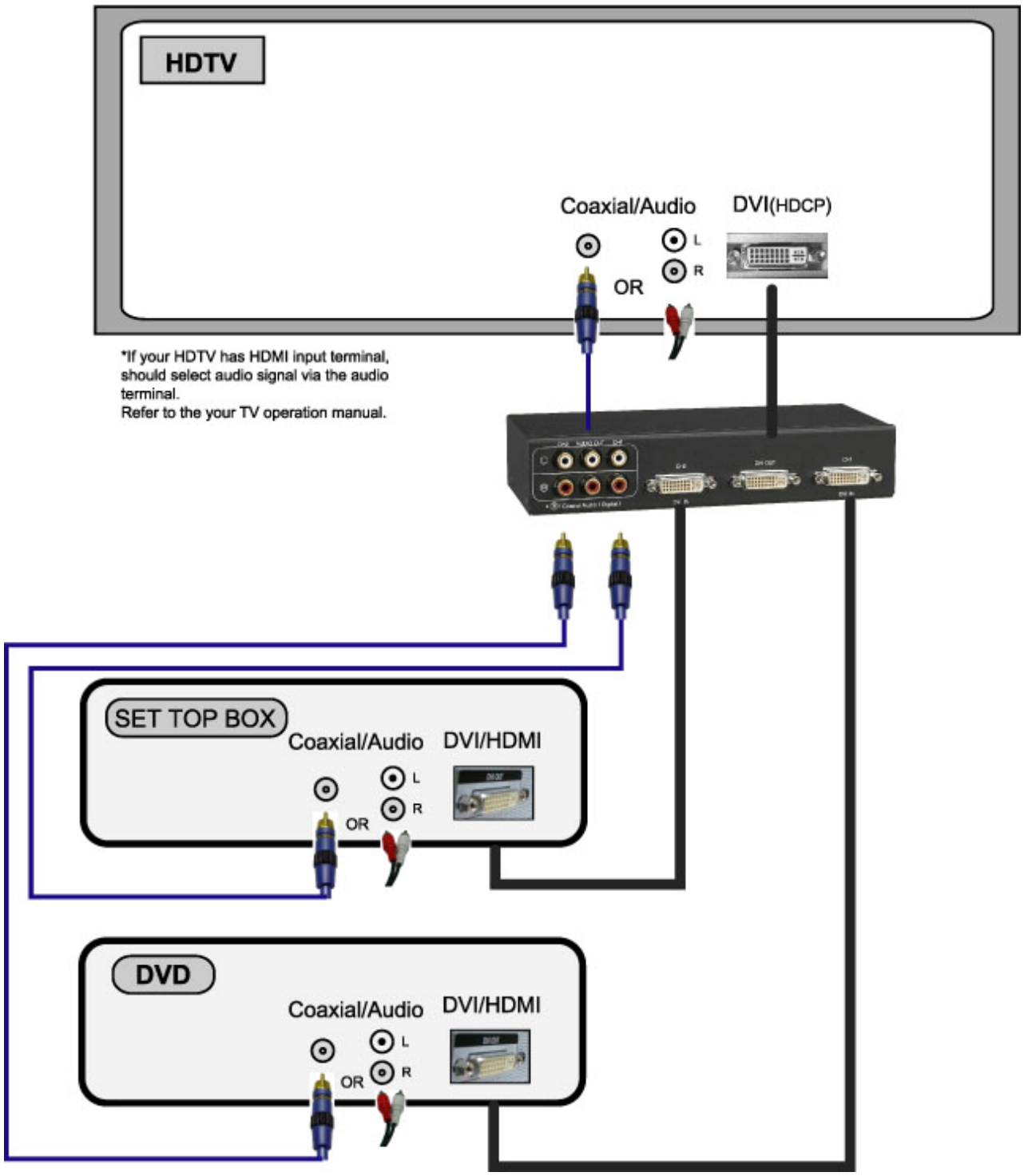
DS-21RA/DS-21A CONNECTION Fig.2



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6 Warranty Information

1 (One) Year Warranty

RTcomUSA warrants this DVI Switcher to be free from defects in workmanship and materials, under normal use and service, for a period of one (1) year from the date of purchase from RTcomUSA or its authorized resellers.

If a product does not work as warranted during the applicable warranty period, RTcomUSA shall, at its option and expense, repair the defective product or part, deliver to customer an equivalent product or part to replace the defective item, or refund to customer the purchase price paid for the defective product.

All products that are replaced will become the property of RTcomUSA.

Replacement products may be new or reconditioned.

Any replaced or repaired product or part has a ninety (90) day warranty or the reminder of the initial warranty period, whichever is longer.

RTcomUSA. shall not be responsible for any software, firmware, information, or memory data of customer contained in, stored on, or integrated with any products returned to RTcomUSA for repair under warranty or not.

Warranty Limitation and Exclusion

RTcomUSA shall have no further obligation under the foregoing limited warranty if the product has been damaged due to abuse, misuse, neglect, accident, unusual physical or electrical stress, unauthorized modifications, tampering, alterations, or service other than by RTcomUSA or its authorized agents, causes other than from ordinary use or failure to properly use the product in the application for which said product is intended.

RETURNS

All returns MUST have an RMA number. Please contact your local dealer or RTcomUSA, Inc where you purchased this product to obtain to RMA number.

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Revision 2

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